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# Primary Forces

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Were gravitation and the other attraction forces suddenly to become inoperative, the form and movement of world materials would undergo remarkable changes; planets, molecules, atoms, electrons and protons would suddenly disintegrate and, in time, the universe would become a homogenous mass of infinitely small particles.

It can be shown, however, that such a chaos would again take form and revert to the present condition; that an infinite number of unthinkably small, elemental particles flying through limitless space in every conceivable direction would lead to the birth of universal gravitation, the accumulation of nebulae, the building of protons, electrons, atoms, and molecules, the shaping of worlds and the formation of the thousands of compound substances known to present day scientists.

Let us suppose that, "in the beginning", the universe consisted of an infinite number of extremely small particles. We must not assume that they would be all of the same size. It would be a remarkable coincidence were such the case. Let us see what would happen if they differed in size.

First, considering the speed of a single particle relative to any other, there would be but one chance out of an infinite number that two such particles would be relatively at rest, (i. e. both moving in the same direction and at the same speed) and there would be one chance out of an infinite number that the relative speed would be infinite. Between these two extremes, each and every conceivable velocity would have an equal chance so that the average velocity of any one particle, relative to that of any other, would be infinity divided by two. This, for all practical purposes, would be infinity.

Our problem, then, is this: Find the result of an infinite number of particles, differing in size, darting through the universe at infinite speed.

It will be seen that any particle, larger than the rest, would be bombarded by the smaller ones on all sides, but that two such larger particles would protect each other somewhat from such bombardment on their facing surfaces, thus being driven towards each other. The force driving them would vary inversely as the square of their distances apart, but not as the product of their masses. It would vary as the square of their diameters, or as their surface areas.

In this way, each larger particle would tend to approach each and every other larger particle in the universe. It can be shown that such particles would form clusters resembling our own Solar system and still larger groups resembling our stellar system. It

can also be shown that, were our stellar system compressed between two huge flat-irons, into the shape of a sheet of paper, it would retain that shape, after a time, even though the flat-irons were removed.

Now let us suppose that a sheet of writing paper is constructed much after the fashion of our stellar system, being made up of electrons, protons, molecules and groups of molecules just as our stellar system is made up of planets, suns, solar-systems, and groups of solar-systems. Would such a sheet of paper act as paper does act at present? Let us see?

Were we to lay such a sheet of paper upon a scale for weighing, the Earth would protect it from bombardment of fine particles from below. The particles bombarding the paper from above would drive it against the scale with a force of say 20 dynes. How is it, then, that two such sheets of paper would be driven against the scale with a force of 40 dynes? The paper surface has not increased, you may say, and so the weight should be but 20 dynes regardless of the number of sheets. Well, this is the solution:

Such a sheet of paper is not the solid it seems to be. It is composed of molecules which, in turn, are built up of atoms. The atoms are formed of protons and electrons and even these smaller units are probably composite. Such a sheet of paper highly magnified would resemble our stellar system. Through such a sheet practically all of the bombarding particles would pass unhampered. This means, of course, that practically as many bombarding particles would pass through the second sheet as through the first and practically the same number would bombard the larger particles in the second sheet as in the first, causing each sheet to be driven with equal force against the scale. If this theory of matter be true it can readily be shown that masses will be driven toward each other with a force which will vary directly as the product of their masses and inversely as the square of the distances between their centers, except in the case of extremely small masses and extremely large masses.

A little figuring will show that even our Sun would allow practically all of the bombarding particles to pass directly through it. For this reason the Moon's attraction for the Earth would not be measurably less during a total eclipse of the Sun.

Thus the theory of "Primary Forces" can be made to account for gravitation, which seems to be instantaneous in its operation. In time it may be made to account for the heat of the Sun as due to the bombardment of the Sun's inner mass. It may even account for the Comet's tail which always points away from the Sun as probably due in some way, to the stream of bombarding particles which have passed through the heated Sun and then through the comet. Atomic energy may be due to the activity of the particles bombarding atoms; the latent energy of suspended weights is readily explained; and even the latent energy of the bent spring can be understood in terms of bombarding particles.

If the theory should prove to be true it is just possible that all phenomena may be explicable in terms of bombarding particles. For instance, such bombardment may cause the explosion of composite units within electrons and thus set up an internal pressure which increases until it more than counterbalances the pressure of bombarding particles from without. Such exploded units would not escape through the surface uniformly at all points but would leave in greater numbers wherever the external pressure was least. Thus, the facing surfaces of two electrons in close proximity, being protected somewhat from bombarding particles, would have a lessened external pressure. The exploding particles from within would stream out through such facing surfaces and drive the electrons apart. Two protons may repel each other for similar reasons. This explanation is not wholly satisfactory but may lead to something better.

In applying the theory of "Primary Forces", however, it should be realized that the situation is not so simple as it has been described. Some of the bombarding particles may, in themselves, be systems of smaller particles held together by still smaller bombarding particles. In searching for the ultimate, indivisible particle we may be hunting the end of the rainbow.

A state of rest in the Universe might be defined as the average motion of all of the bombarding particles. All larger masses would tend to acquire this average motion just as a balloon tends to float with the wind. Thus it is that stars are relatively at rest or nearly so as compared with the infinite speed of the particles causing gravitation. While the fixed stars represent the average or balance of the motion of bombarding particles, yet this is not necessarily the same in different parts of the universe. Drifts and eddies may occur in the great flow of bombarding particles. Again, as sand grains are sorted as to size or weight by the varying velocities of a stream, so the bombarding particles which are composite may be assorted somewhat as to size and banked in different parts of the universe.

Many strange phenomena are sure to arise which could not be accounted for merely by assuming a theory of bombarding particles in its simplest form. There seems to be a striving toward more and more complex organization and it may be that this striving, although necessarily deterministic, is accompanied by consciousness. It may even turn out to be true that mind and energy are synonymous terms. Evidence seems to be pointing in that direction just at present.